

(1) Upon completion of the piping installation, and before the cylinders are connected, a pressure test shall be applied as set forth in this paragraph. Only carbon dioxide or other inert gas shall be used for this test.

(2) The piping from the cylinders to the stop valves in the manifold shall be subjected to a pressure of 1,000 pounds per square inch. With no additional gas being introduced to the system, it shall be demonstrated that the leakage of the system is such as not to permit a pressure drop of more than 150 pounds per square inch per minute for a 2-minute period.

(3) The individual branch lines to the various spaces protected shall be subjected to a test similar to that described in the preceding subparagraph with the exception that the pressure used shall be 600 pounds per square inch in lieu of 1,000 pounds per square inch. For the purpose of this test, the distribution piping shall be capped within the space protected at the first joint ahead of the nozzles.

(4) In lieu of the tests prescribed in the preceding paragraphs in this paragraph, small independent systems protecting spaces such as emergency generator rooms, lamp lockers, chemical storerooms, etc., may be tested by blowing out the piping with air at a pressure of at least 100 pounds per square inch.

§ 193.15-20 Carbon dioxide storage.

(a) Except as provided in paragraph (b) of this section, the cylinders shall be located outside the spaces protected, and shall not be located in any space that might be cut off or made inaccessible in the event of a fire in any of the spaces protected.

(b) Systems of the type indicated in § 193.15-5(d), consisting of not more than 300 pounds of carbon dioxide, may have cylinders located within the space protected. If the cylinder stowage is within the space protected, the system shall be arranged in an approved manner to be automatically operated by a heat actuator within the space in addition to the regular remote and local controls.

(c) The space containing the cylinders shall be properly ventilated and designed to preclude an anticipated

ambient temperature in excess of 130° F.

(d) Cylinders shall be securely fastened and supported, and where necessary, protected against injury.

(e) Cylinders shall be so mounted as to be readily accessible and capable of easy removal for recharging and inspection. Provisions shall be available for weighing the cylinders.

(f) Where subject to moisture, cylinders shall be so installed as to provide a space of at least 2 inches between the flooring and the bottom of the cylinders.

(g) Cylinders shall be mounted in an upright position or inclined not more than 30 degrees from the vertical. However, cylinders which are fitted with flexible or bent siphon tubes may be inclined not more than 80 degrees from the vertical.

(h) Where check valves are not fitted on each independent cylinder discharge, plugs or caps shall be provided for closing outlets when cylinders are removed for inspection or refilling.

(i) All cylinders used for storing carbon dioxide must be fabricated, tested, and marked in accordance with the requirements of §§ 147.60 and 147.65 of this chapter.

[CGFR 67-83, 33 FR 1145, Jan. 27, 1968, as amended by CGD 84-044, 53 FR 7753, Mar. 10, 1988]

§ 193.15-25 Discharge outlets.

(a) Discharge outlets shall be of an approved type.

§ 193.15-30 Alarms.

(a) Space normally accessible to persons on board while the vessel is being navigated which are protected by a carbon dioxide extinguishing system and are required to be fitted with a delayed discharge system other than paint and lamp lockers and similar small spaces, shall be fitted with an approved audible alarm which will be automatically sounded when the carbon dioxide is admitted to the space. The alarm shall be conspicuously and centrally located and shall be marked as required by § 196.37-9 of this subchapter. Such alarms shall be so arranged as to sound during the 20-second delay period prior to the discharge of carbon dioxide into the space, and the alarm shall depend

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on no source of power other than the carbon dioxide.

§ 193.15-35 Enclosure openings.

(a) Where mechanical ventilation is provided for spaces which are protected by carbon dioxide extinguishing systems provisions shall be made so that the ventilation system is automatically shut down with the operation of the system to that space.

(b) Where natural ventilation is provided for spaces protected by a carbon dioxide extinguishing system, provisions shall be made for easily and effectively closing off the ventilation.

(c) Means shall be provided for closing all other openings to the space protected from outside such space. In this respect, relatively tight doors, shutters, or dampers shall be provided for openings in the lower portion of the space. The construction shall be such that openings in the upper portion of the space can be closed off either by permanently installed means or by the use of canvas or other material which is normally carried by the vessel.

§ 193.15-40 Pressure relief.

(a) Where necessary, relatively tight compartments such as refrigeration spaces, paint lockers, etc., shall be provided with suitable means for relieving excessive pressure accumulating within the compartment when the carbon dioxide is injected.

§ 193.15-90 Installations contracted for prior to March 1, 1968.

(a) Installations contracted for prior to March 1, 1968, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be permitted to the same standards as the original installations. However, all new installations or major replacements shall meet the applicable requirements in this subpart for new installations.

(2) The details of the systems shall be in general agreement with §§193.15-5

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through 193.15-40 insofar as is reasonable and practicable, with the exception of §193.15-5(d) (1), (2), and (4), covering machinery spaces, etc., which systems may be installed in accordance with paragraphs (a) (3) through (6) of this section.

(3) In boilerrooms, the bilges shall be protected by a system discharging principally below the floorplates. Perforated pipe may be used in lieu of discharge nozzles for such systems. The number of pounds of carbon dioxide shall be equal to the gross volume of the boilerroom taken to the top of the boilers divided by 36. In the event of an elevated boilerroom which drains to the machinery space, the system shall be installed in the engineroom bilge and the gross volume shall be taken to the flat on which the boilers are installed.

(4) In machinery spaces where main propulsion internal combustion machinery is installed, the number of pounds of carbon dioxide required shall be equal to the gross volume of the space taken to the under side of the deck forming the hatch opening divided by 22.

(5) In miscellaneous spaces other than cargo or main machinery spaces the number of pounds of carbon dioxide required shall be equal to the gross volume of the space divided by 22.

(6) Branch lines to the various spaces other than cargo and similar spaces shall be as noted in Table 193.15-90(a)(6). This table is based on cylinders having discharge outlets and siphon tubes of 3/8-inch diameter.

TABLE 193.15-90(a)(6)

Number of cylinders		Nominal pipe size, inches
Over	Not over	
.....	2	1/2—standard.
2	4	3/4—standard.
4	6	1—extra heavy.
6	12	1 1/4—extra heavy.
12	16	1 1/2—extra heavy.
16	27	2—extra heavy.
27	39	2 1/2—extra heavy.
39	60	3—extra heavy.
60	80	3 1/2—extra heavy.
80	104	4—extra heavy.
104	165	5—extra heavy.